material brilliant phosphorescence occurred. The same results were obtained with anhydrous chloroform, ethyl alcohol, acetone and carbon tetrachloride. The material is therefore insoluble in fat solvents.

It is most likely a protein but belongs among the proteins insoluble in water. By means of a specially constructed apparatus I was able to extract with oxygen-free distilled water and to filter the extract in an oxygen-free space. On admitting air the filtrate did not glow, but the filter paper showed innumerable bright dots. The granules of luminous substance are therefore insoluble in water. A lack of material has prevented extraction with other protein solvents, salt solution, acids and alkalies.

E. Newton Harvey

Princeton, N. J.,

The American Chemical Society. II

Division of Fertilizer Chemistry

J. E. Breckenridge, Chairman

F. B. Carpenter, Secretary

Chairman's Address: *Chemistry an Important Factor in the Fertilizer Industry:* J. E. Breckenridge.

The Preparation of Neutral Ammonium Citrate: Ermon D. Eastman and Joel H. Hildebrand.

The proposed method depends on the preparation of a standard sodium phosphate solution of known hydrogen ion concentration and the comparison of the color produced by rosolic acid in this solution with that produced by the same indicator in the ammonium citrate solution to be tested. The normal ammonium citrate solution is shown by its hydrogen ion concentration to be slightly acid and the authors have therefore adopted the neutral rather than the normal solution.

A Comparison of Neutral Ammonium Citrate with Sodium Citrate and N/10 Citric Acid: Paul Rudnick, W. B. Derby and W. L. Latshaw.

Sodium citrate proposed by Bosworth (2) can be used as a substitute for the official neutral ammonium citrate, but N/10 citric acid obviates difficulties due to highly concentrated solutions, such as slowness in filtration, etc., and gives results which are in excellent agreement with those obtained by the official neutral ammonium citrate.

The Separation of Organic Nitrogen from Mixed Fertilizers: C. H. Jones.

The method recommended depends on separation by gravity in carbon tetrachloride. Tables giving the behavior of various fertilizer ingredients and their availability by the alkaline permanganate method are included.

Separation of Phosphoric Acid from Lime: F. K. Cameron.

A discussion of the solubility curves of potassium and ammonium phosphates and their applications to practical problems.

Separation of Potash from Kelp (lantern): F. K. Cameron.

An illustrated description of the kelp beds and the methods of harvesting so far developed.

Division of Pharmaceutical Chemistry

F. R. Eldred, chairman

A. P. Sy, Secretary

Methods of Analysis of the Forthcoming Pharmacopœia: H. W. Wiley.

Seasonal Variation in the Composition of the Thyroid Gland: Atherton Seidell and Frederic Fenger.

The experiments upon this subject embracing the period August, 1911, to August, 1912, have been continued for another one-year period beginning December 1, 1912. The evidence for the seasonal variation in iodine content of the thyroid gland has been confirmed, and additional data obtained, showing that a regular change of phosphorus and ash, varying inversely with the iodine, occurs. In regard to the fresh weight of the glands, the results indicated a regular seasonal change in the case of the beef and sheep, but not with the hog. The results demonstrate the practicability of a standard of 0.2 per cent. iodine in commercial desiccated thyroids.

Some Peculiarities of Present Food and Drug Laws: Frank O. Taylor.

Notes on the Determination of Antipyrine: George D. Beal and Duane T. Englis.

Antipyrine and caffeine can be easily extracted by chloroform from an aqueous solution three-fourths saturated with sodium chloride. If the liquid contains vegetable extractives, the extraction can be effected without emulsification by first precipitating the coloring matter, resins, etc., with lead acetate. The antipyrine may be titrated in the presence of caffeine by Bougault's[1] method,

[1] *Jour. Pharm. Chem.*, [6], 1, 161, 11, 97.

using an alcoholic solution of iodine, and adding at the same time an alcoholic solution of mercuric chloride, to take up the liberated hydriodic acid. One gram of antipyrine = 1.351 grams of iodine. The authors find that as effective a method consists in the substitution of an ordinary N/10 iodine solution for the alcoholic iodine solution, titrating in the presence of alcohol, and adding sufficient alcoholic mercuric chloride to combine with the hydriodic acid liberated and in addition enough to combine with the potassium iodide in the N/10 iodine solution. The results are accurate and the endpoint is distinct.

Further Notes on Lloyd's Reagent for Alkaloids: SIGMUND WALDBOTT.

In precipitating quinine from aqueous solutions of quinine bisulphate by means of Lloyd's reagent,[2] the filtrate upon evaporation yields crystals of calcium sulphate, due to the calcium contents of the reagent. When the CaO is completely removed by hydrochloric acid, the modified acid-free reagent, upon precipitating quinine from quinine bisulphate, yields free sulphuric acid in the filtrate. This demonstrates that the affinity of the reagent for alkaloid is strong enough to tear asunder the quinine bisulphate molecule.

Estimation of Phenacetin and Acetanilide in Admixture: W. O. EMERY.

Estimation of Antipyrin: W. O. EMERY AND S. PALKIN.

Estimation of Caffeine and Antipyrin in Admixture: W. O. EMERY AND S. PALKIN.

Estimation of Phenacetin and Salol in Admixture: W. O. EMERY, C. C. LEFEVRE AND G. C. SPENCER.

A Method for the Estimation of Podophyllum Resin: W. M. JENKINS.

Commercial Papain and its Testing: H. M. ADAMS.

Some Observations on the Leach Test for Coumarin: WILLIAM G. GAESSLER.

Digitalis Ash: CHARLES T. P. FENNEL.

The recognized importance of mineral constituents in plants, the elements of plant development —their equal importance to plant life—classification as air and soil groups—products of plant life —products of physiological processes not in the ash—foundation substances of the soil—the needs of proper soil to fit the plant for specific purposes—medicinal plants—history of the method of use—juices direct—watery extracts, alcoholic extracts—isolation of so-called active constituents—variations in therapeutic action—the preexistence and the generation of active constituents by manipulation of processes of extraction—digitalis and other plants—the ash—constituents—peculiarities—elementary decay—eka silicon—radioactive matter in rocks and soils—effect on plant life—experimentally.

[2] *Cf. Jour. Amer. Chem. Soc.*, June, 1913.

The Estimation of Morphine: H. M. GORDIN.

The Estimation and Variability of Alcohol in Galenicals: L. F. KEBLER.

Results of the Examination of Some Medical Agents in the District of Columbia: L. F. KEBLER.

Extraction of Morphine from Aqueous Solution: H. BUCHBINDER.

DIVISION OF INDUSTRIAL CHEMISTS AND CHEMICAL ENGINEERS

Geo. P. Adamson, Chairman

S. H. Salisbury, Jr., Secretary

Volumetric Determination of Sulphur in Iron Ore: L. SELMI.

The method is based on the ignition of the ore in a current of hydrogen and in presence of zinc (and animal charcoal if sulphates of lime and barium are present). The reduction is prolonged for about twenty minutes and the heat discontinued and the furnace cooled rapidly at room temperature while the hydrogen is kept going through the furnace. When room temperature is attained the reduced ore is transferred to an evolution flask and the H_2S evolved as in the case of iron and steel. Accurate results have been obtained in less than one hour, and this method is especially adapted for the determination of low sulphur in iron ores. The apparatus required is a fused silica tube, heated either by electricity or gas, a Kipp hydrogen generator and three gas washing bottles. On a number of determinations by this method I obtained the following sulphur results on the Bureau of Standards magnetite ore (standard .025 per cent.): .025, .026, .025, .024, .027, .025.

Pitot Tubes for the Measurement of Gas Velocities: ANDREW M. FAIRLIE.

Numerous instances are cited in which some method of accurately measuring gas velocities is needed. Errors appearing in recent publications on this subject are corrected. As a result of recent work, a type of Pitot tube is indicated, which chemical engineers may select and use, under certain conditions, with confidence. Features requiring further investigation are pointed out.

A Comparison of Various Modifications of the Kjeldahl and Dumas Methods for the Determination of Nitrogen in Coal and Lignite: A. C. FIELDNER AND C. A. TAYLOR.

The Mechanism of the Reaction between Phenolic Bodies and Active Methylenes: L. V. REDMAN, A. J. WEITH AND E. P. BROCK.

Fluorescence of Petroleum Oils: BENJAMIN T. BROOKS.

Engler and others consider that fluorescence of petroleum oils is due to colloid matter suspended or emulsified with the oil. Experiments of the author with the ultramicroscope showed that this can not be the case. Such fluorescent oils give no indication of electrophoresis. The fluorescent substance or substances readily form sulphonic acids, which are soluble in water and may be separated from the acid sludge tar obtained on treating with concentrated sulphuric acid. In general oxidizing agents destroy the fluorescent substance, but the action of nitro compounds as "deblooming" agents is purely physical. If an oil is debloomed by nitrobenzol, for instance, removal of the latter by shaking out with alcohol restores the fluorescence. The nitro group apparently does not have to be introduced into the molecule of the fluorescent substance itself in order to "cover up" the fluorescence. Other compounds employed as solvents, such as amyl alcohol, carbon bisulphide, aniline benzol, etc., appear to affect the fluorescence of petroleum oils in much the same way as Kauffman found for terephthalic acid esters. Distillation of crude petroleum at atmospheric pressure yields more highly fluorescent distillate than the same oil distilled in vacuo. The fluorescent substances therefore result from pyrogenic decomposition in much the same way as the fluorescent hydrocarbons obtained in the distillation of coal.

The Manufacture of Gasoline from Heavy Petroleum Oils (lantern): B. T. BROOKS, R. F. BACON AND C. W. CLARK.

Some Economic Phases of the Gasoline Supply: BENJAMIN T. BROOKS.

Curves are given showing the rate of increase in the consumption of gasoline and its production from crude petroleum. Production of gasoline or motor spirit may be increased by (1) cracking heavier hydrocarbons, (2) employing motor spirit of lower Beaume gravity than now customary, (3) casing head gasoline. It is shown that benzol is not and probably can not be manufactured in sufficient quantity to meet the growing demand for motor fuel. Alcohol may be used to some extent should the price of gasoline exceed 40 cents per gallon. Alcohol is not now used for this purpose in England, where gasoline has been selling for approximately 40 cents for the last two years.

Absorption of Caustic Soda by Cellulose: W. D. BANCROFT.

The Stability of Rosin at Slightly Elevated Temperatures.—A Correction: CHAS. H. HERTY AND H. L. COX.

The Chemists' Club: WILLIAM L. DUDLEY.

The Chemist, a Growing Factor in Merchandizing: A. V. H. MORY.

The old rule of trade, "Let the buyer beware," is rapidly giving way to the rule, "Let the seller beware." The small consumer never has been able to more than roughly inspect the character of his purchases. The merchant has always been better able to afford a thorough inspection. Now that the law is placing the responsibility on him, the merchant is more and more under the necessity of turning to technical aid. There is also a natural law, making rigid inspection on the part of the merchant a good business investment, viz.: The satisfied customer is the basis for permanent merchandizing success, and satisfaction can come only through insuring quality and accuracy in description. A new field, therefore, which may be called laboratory inspection of merchandise, is rapidly growing, and is likely to receive great impetus through the enactment of general commodity laws.

The Method of Analysis of Gasoline: G. W. GRAY.

The Method of Testing Illuminating Oils: G. W. GRAY.

Coal Ash in Some Unusual Phases: S. W. PARR.

A Thermoelectric Method of Determining the Purity of Platinum Ware: G. K. BURGESS AND P. D. SALE.

As illustrated for crucibles, this method consists in measuring the E.M.F. across the crucible rim, one side being heated and the other not. A fine wire (0.2 mm.) of pure platinum is arc-soldered to one side and a Pt, Pt-Rh junction to the other. The iridium content or platinum purity of the crucible may be very exactly determined by the E.M.F. developed between the Pt wires and the temperature as measured by the Pt, Pt-Rh thermocouple, using an ordinary pyrometer galvanometer. The Bureau of Standards is prepared to test the platinum purity of crucibles by this method.

A Nevada Oil Shale: CHAS. BASKERVILLE.

The Metallography of Malleable Iron: J. CULVER HARTZELL.

A brief survey of the field with special reference to the difficulties encountered in correlating the chemical and structural analyses of malleable cast iron in the hard and in the annealed states.

The Pyrometer in the Assay Muffle: FREDERIC P. DEWEY.

Standing alone, by itself, a pyrometer reading has absolutely no value as a control of assay operations in a muffle or as a guide to the assayer in carrying on such operations. The reasons for this are varied and complex. In the first place, the temperature that controls the success of the operation is that of the lead button undergoing oxidation. At present we have no means of learning this temperature under practical working conditions, so that some suitable place must be selected within the muffle for the location of a pyrometer. Unfortunately, however, and in the second place, there is absolutely no approach even to a fixed relation between the pyrometer reading at any given point available and the temperature of the oxidizing button. The oxidation of the lead supplies much heat to the button, but its effect upon the pyrometer is negligible. One factor governing the amount of heat utilized by the button is the rate of oxidation of the lead, and this in turn is, within wide limits, largely influenced by the passage of the air over the button, so that to fully utilize and apply the pyrometer reading we must also know the height of the barometer and the effect of variations in the barometer readings upon the draft of the particular muffle under consideration. Further and most important, from a practical standpoint, is the freedom of entrance for the air to the muffle. In other words, by manipulating the door or stopper of the muffle, widely varying differences between the button temperature and the pyrometer reading may be produced. The effect of the door condition is twofold. It affects the supply of air to the button and also the actual temperature of the bottom of the muffle on account of varying amounts of air that have to be heated there in passing through the furnace. Finally, the relation of the position of the button within the muffle to that of the pyrometer is vital. Therefore, to intelligently utilize any stated pyrometer reading it is essential to have exact information upon a variety of other conditions surrounding the operation. However, the pyrometer is a good general guide to temperature conditions, but the man who depends upon it entirely will not be a good cupeller.

Note on a Cause of Spontaneous Combustion in Coal Mines: HORACE G. PORTER.

Graphical Studies of the Ultimate Analyses of Coals: OLIVER C. RALSTON.

Plotting the ultimate analyses of coals, in terms of carbon, hydrogen and oxygen, on the "ternary diagram" as modified to compensate the greater errors involved in the term "oxygen," has given results of surprising concordance. Some thousands of analyses are plotted with different objects in view. Classification into anthracite, semi-anthracite, semi-bituminous, bituminous, etc., is very easy, as each of these falls in a certain area of the diagram. The effects of oxidizing coals, heating them, fractionating them mechanically, chemically and physically, etc., are studied with the revelation of many interesting relations. Methods are given of judging with fair accuracy the calorific value, volatile and moisture of the coals in different parts of the diagram. All the analyses in Bull. 22 of the Bureau of Mines are plotted and constitute an interesting criticism on the accuracy of work done there and seem to fall within probable error, as near as such an error can be calculated on such a complex substance as coal. This paper will be published by the Bureau of Mines.

Osage Orange, Its Value as a Commercial Dyestuff: F. W. KRESSMANN.

It has long been known in the southwest that the wood of the Osage orange tree contains a dyestuff that would give a more or less fast yellow color.

An examination of the wood from Texas showed that it not only contains moric acid and morintannic acid, the same as fustic wood, but also that the dyeing principles are present in amount to be commercially valuable. A comparative series of dyeing experiments made with fustic and Osage orange wood and extracts showed the latter to be of equal value with fustic in regard to depth of colors produced, the amount of extract, the character of the dyeing and fastness to light, weather, washing, etc.

Some Preliminary Experiments on the Hydrolysis of White Spruce, etc.: F. W. KRESSMANN.

On hydrolyzing spruce with dilute sulphuric acid solutions it was found that the yields of sugar increased rapidly with increasing pressures of digestion up to a pressure of 7½ atmospheres, above which point the decrease was quite rapid. The reaction is probably reversible, since the large decrease can not be accounted for entirely by sugar decomposition.

About 70 per cent. of the total sugar produced

is fermentable. Yields of 23 gallons of 95 per cent. alcohol per dry ton of wood have been obtained. Acetic and formic acids are also products of hydrolysis, the yield of the former being constant (about 1.42 per cent.) over a wide range of cooking conditions. The yield of formic acid increases with increasing severity of cooking conditions. The acetic acid and part of the formic acid are probably due to hydrolysis of acetyl and formyl in the lignin complex, while part of the formic acid results from sugar decomposition.

A Method for the Rapid Quantitative Analysis of Bronze and Brass, Pb, Cu, Sn, Sb, Fe and Zn: Richard Edwin Lee, John P. Trickey and Walter H. Fegely.

The authors of this paper have made a careful experimental survey of the majority of the better-known methods for the quantitative analysis of brass and bronze, but have failed to find a method which was both rapid and accurate. It is pointed out that such a method is needed for "control" work, as well as for routine work in testing laboratories. The authors have then formulated a scheme for the quantitative analysis of these alloys which is apparently very rapid and at the same time meets the usual requirements in regard to accuracy. It is claimed that the complete analysis of three different bronzes containing Pb, Cu, Sn and Zn can be completed inside of two hours. Each determination is made on a separate portion of the sample. The series of test experiments incorporated in the paper indicates that the methods permit of a wide application. The maximum error of any determination in any series is .15 per cent.; the average error, however, is much less.

A Method for the Rapid Quantitative Analysis of Babbitt Metals, Pb, Cu, Sn and Sb: Richard Edwin Lee, John P. Trickey and Walter H. Fegely.

This paper contains a report of a rapid and accurate method for the quantitative analysis of Babbitt metals. The chief objection urged by the authors against the majority of the methods that have been proposed is that they require too much time for their execution. In the method reported, each determination is made from a separate portion of the sample, with the exception of Sn, which is determined volumetrically in the same solution in which Sb is determined. The maximum error is .15 per cent.; the average error, however, is less. Demorest's method has been articulated with the proposed method so that an alloy close to the limit of the specification may be checked by a different although longer method. The methods have been tested in two large commercial laboratories for several months and found satisfactory.

The Composition and Testing of Printing Inks: J. B. Tuttle and W. H. Smith.

The Determination of Carbon in Iron and Steel by the Barium-Carbonate Titration Method: J. R. Cain.

The apparatus used for filtration, difficulties and sources of error, with means of obviating these, are described, and details are given of a series of experiments showing the special application and the degree of accuracy of the barium carbonate titration method when applied in steel analysis.

Determination of Ammonia in Illuminating Gas: J. D. Edwards.

This paper is a summary of the results of a brief investigation of the apparatus and methods employed for the commercial determination of ammonia in illuminating gas. The five forms of apparatus studied gave results, when properly operated, well within the limits of accuracy required for this determination either for commercial control work or for the purpose of gas inspection. Suitable indicators have been recommended and precautions to be observed in the operation of the different forms of apparatus have been pointed out.

The Iodine Number of Linseed and Petroleum Oils: W. H. Smith and J. B. Tuttle.

The iodine values of raw, boiled and burnt linseed oils, and petroleum oils, were determined by the Hanus method, varying widely the amounts of oil and iodine used, and the time of absorption. A study of the effect of temperature on the iodine value was made. It is shown that in order to obtain concordant results, a prescribed procedure must be followed, and exact conditions stated.

Chemical Jurisprudence: Louis Hogrefe.

Report of the Committee on Alum Specifications.

SECTION OF INDIA RUBBER CHEMISTRY

D. A. Cutler, Chairman

Dorris Whipple, Secretary

The Influence of Temperature in the Physical Testing of Rubber Goods: T. L. Wormeley and J. B. Tuttle.

Review of Report of Joint Rubber Insulating Committee: Dorris Whipple.

Charles L. Parsons,
Secretary

(*To be continued*)